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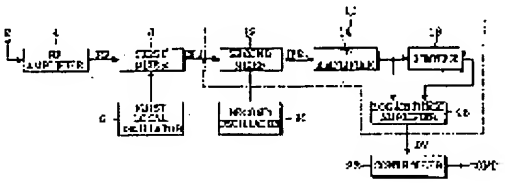
(54) MOBILE STATION TRANSMISSION POWER CONTROL METHOD

(57) Abstract:
PROBLEM TO BE SOLVED: To provide a transmission power control method which can always and automatically control reception and transmission power in an optimum state.
SOLUTION: An output of an IF amplifier 14 and a limiter 16 is converted into direct voltage DV by a logarithmic amplifier 18, and a control part 22 measures the reception power (RSSI) of the mobile station by using this and decides and controls transmission power from the measured result. The method calculates and adjusts the transmission power from the mean value of reception power for a prescribed time, the transmission power of a base station which is analyzed by a packet transmitted by the base station and reception power that is desired by the base station. The transmission power is decided by adding the value, which subtracted the mean value of the reception power from the transmission power of the base station, to the reception power that is desired by the base station during the subscribing procedure. A 1st stage where present transmission power is decided by adding the value which subtracted the mean value of the reception power from the transmission power of the base station to the reception power, which is desired by the base station and a 2nd stage where the present transmission power, is adjusted according to the change width between previous transmission power and the present transmission power are performed after the subscribing procedure.



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CLAIMS

[Claim(s)]
[Claim 1] the received power which is the transmitted power control technique in the mobile station which performs the radio with a base station, and is wished the received-power average during predetermined time in the transmitted power of a base station and the base station which are analyzed from the packet transmitted from the base station -- since -- the mobile station transmitted power control technique characterized by calculating and adjusting transmitted power
[Claim 2] The received-power average is the mobile station transmitted power control technique according to claim 1 searched for by adding the received-power value acquired the number of predetermined times, and breaking by the aforementioned number of times of predetermined between predetermined time.
[Claim 3] The mobile station transmitted power control technique according to claim 1 or 2 of determining transmitted power from the transmitted power of a base station in a subscription procedure in addition to the received power which desires the value which lengthened the received-power average in a base station.
[Claim 4] The mobile station transmitted power control technique according to claim 3 of performing the 2nd phase of adjusting the aforementioned present transmitted power from the transmitted power of a base station after a subscription procedure according to the change width of face between the 1st phase of determining the present transmitted power in addition to the received power which desires the value which lengthened the received-power average in a base station, and the pre-transmitted power in front of the predetermined time which calculated the aforementioned received-power average and the aforementioned present transmitted power.
[Claim 5] The 2nd phase is the mobile station transmitted power control technique according to claim 4 which will make the present transmitted power of the 1st phase transmitted power as it is if the specified quantity is fluctuated and adjusted to the transmitted power before the above, it considers as transmitted power and it has fitted in the aforementioned predetermined change width of face when the change between pre-transmitted power and the present transmitted power exceeds predetermined change width of face.
[Claim 6] The 1st process in which the received-power average is calculated by adding the received-power value which is the transmitted power control technique in the mobile station which performs the radio with a base station, and was acquired the number of predetermined times between predetermined time, and breaking by the aforementioned number of times of

predetermined, The 2nd process in which the present transmitted power is determined from the transmitted power of a base station in addition to the received power which desires the value which lengthened the aforementioned received-power average in a base station, The mobile station transmitted power control technique characterized by performing the 3rd process in which the aforementioned present transmitted power is adjusted according to the change width of face between the pre-transmitted power in front of the predetermined time which calculated the aforementioned received-power average, and the aforementioned present transmitted power.

[Claim 7] The received power desired in the transmitted power of a base station and a base station is the mobile station transmitted power control technique according to claim 6 by analysis of the packet transmitted from a base station.

[Claim 8] The 3rd process is the mobile station transmitted power control technique according to claim 6 or 7 repeated in a line crack considering the predetermined time which calculates the received-power average as 1 cycle while the 2nd process is performed and a communication is performed after the subscription procedure of a mobile station also into the subscription procedure of a mobile station.

[Claim 9] The 3rd process is the mobile station transmitted power control technique given in any 1 term of the claims 6-8 which will make the present transmitted power of the 2nd process transmitted power as it is if the specified quantity is fluctuated and adjusted to the transmitted power before the above, it considers as transmitted power and it has fitted in the aforementioned predetermined change width of face when the change between pre-transmitted power and the present transmitted power exceeds predetermined change width of face.

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the technique of adjusting the transmitted power of a mobile station especially, about the mobile station which performs the radio with a base station.

[0002]

[Problem(s) to be Solved by the Invention] In the mobile station of a radio, although the intensity of received power changes with move positions, since the transmitted power determined at the time of the first subscription procedure will always be held, transmitted power cannot necessarily perform the optimum communication according to the status.

[0003] Then, the purpose of this invention is about received power and transmitted power to offer the transmitted power control technique which can always be automatically controlled in the optimum status.

[0004]

[Means for Solving the Problem] the received power desired in the transmitted power of a base station and the base station which are analyzed from the received-power average during predetermined time, and the packet transmitted from the base station as the transmitted power control technique in the mobile station which performs the radio with a base station by this invention for this purpose -- since -- the mobile station transmitted power control technique characterized by calculating and adjusting transmitted power is offered The received-power average can be calculated by adding the received-power value acquired the number of

predetermined times, and breaking by the aforementioned number of times of predetermined between predetermined time. In addition to the received power which desires the value which lengthened the received-power average from the transmitted power of a base station in a subscription procedure in a base station, transmitted power is determined. moreover, after a subscription procedure The 1st phase of determining the present transmitted power from the transmitted power of a base station in addition to the received power which desires the value which lengthened the received-power average in a base station, It is made to perform the 2nd phase of adjusting the aforementioned present transmitted power according to the change width of face between the pre-transmitted power in front of the predetermined time which calculated the aforementioned received-power average, and the aforementioned present transmitted power. If the 2nd phase fluctuates and adjusts the specified quantity to the transmitted power before the above, and makes it transmitted power and it has fitted in the aforementioned predetermined change width of face when the change between pre-transmitted power and the present transmitted power exceeds predetermined change width of face, it will make the present transmitted power of the 1st phase transmitted power as it is.

[0005] moreover, according to this invention, as the transmitted power control technique in the mobile station which performs the radio with a base station The 1st process in which the received-power average is calculated by adding the received-power value acquired the number of predetermined times, and breaking by the aforementioned number of times of predetermined between predetermined time, The 2nd process in which the present transmitted power is determined from the transmitted power of a base station in addition to the received power which desires the value which lengthened the aforementioned received-power average in a base station, The mobile station transmitted power control technique characterized by performing the 3rd process in which the aforementioned present transmitted power is adjusted according to the change width of face between the pre-transmitted power in front of the predetermined time which calculated the aforementioned received-power average, and the aforementioned present transmitted power is offered.

[0006] The received power desired in the transmitted power of a base station and a base station shall just be based on analysis of the packet transmitted from a base station. Moreover, the 2nd process is performed also into the subscription procedure of a mobile station, and the 3rd process shall be repeated considering the predetermined time which calculates the received-power average as 1 cycle, while a communication is performed after the subscription procedure of a mobile station. If the 3rd process fluctuates and adjusts the specified quantity to the transmitted power before the above, and makes it transmitted power and it has fitted in the aforementioned predetermined change width of face when the change between pre-transmitted power and the present transmitted power exceeds predetermined change width of face, it shall make the present transmitted power of the 2nd process transmitted power as it is.

[0007]

[Embodiments of the Invention] Hereafter, with reference to an accompanying drawying, it explains in detail per operation gestalt of this invention.

[0008] The mobile station of this example is shown in drawing 1 with a block diagram. The radio signal received through an antenna 2 is amplified by the Radio Frequency (RF:Radio Frequency) amplifier 4. With the 1st mixer 8, it is mixed with the frequency from the 1st local oscillator 6, and the input signal after this amplification serves as 1st intermediate frequency (IF:Intermediate Frequnecy) signal IF1. And further, with the 2nd mixer 12, it is mixed with

the frequency from the 2nd local oscillator 20, and this IF1 turns into 2nd intermediate frequency signal IF2. After amplifying 2nd intermediate frequency signal IF2 with the IF amplifier 14, a limit is added to an amplitude by the limiter (Limiter) 16. Usually, the signal outputted from this limiter 16 is a signal with which a user is provided.

[0009] By this example, the amount of currents of the signal outputted from the IF amplifier 14 and the limiter 16 is changed into direct current voltage DV by the logarithmic amplifier 18. Using this direct current voltage DV outputted, a control section 22 is the intensity (Received Signal Strength Indicator:RSSI) of the received power of the concerned mobile station. It can measure. And a control section 22 outputs control signal CONT for controlling transmitted power, after determining transmitted power from the measurement result of RSSI.

[0010] The control flow chart at the time of determining the RSSI is shown in drawing 2 . That is, the process which reads RSSI value of an input signal and is changed per power with a predetermined period (100mS), the process which carries out the accumulation total of this conversion power, the process which calculates the average of the value by which the accumulation total was carried out between predetermined time (2 seconds), and ** are carried out. First, the process in which the average of this received power is calculated with reference to drawing 2 is explained.

[0011] A control section 22 sets counter value n to "0" in 210 phases. the ground for setting up this counter value -- predetermined time (2 seconds) inside -- predetermined period (100mS) number-of-times = -- it is for counting "20" in this example And in 212 phases, an internal timer is checked and progress of 100mSs is judged. These 100mSs can be set up suitably. When 100mSs pass, it goes on in 214 phases and a control section 22 reads RSSI value. This RSSI value is offered by the direct current voltage DV which changed the amount of currents of the signal outputted from the IF amplifier 14 and the limiter 16 by the logarithmic amplifier 18. A control section 22 changes read RSSI value per power. Following [table 1] shows the power unit corresponding to the direct current voltage DV outputted from the logarithmic amplifier 18.

[Table 1]

[0012] The power units changed by [Table 1] are 218 phases, and the power unit changed the front predetermined period accumulates them, and they are stored in an extraordinary buffer as PRSSI_READ. Control sections 22 are 220 continuing phases, and counter value n checks from 19 whether it is the parvus. The ground for performing these 220 phases is predetermined time (2 seconds). It is for judging whether it passed or not.

[0013] If counter value n is smaller than 19 in 220 phases, it is this (2 seconds), i.e., predetermined time. It is judged that it has not passed, and after going on to 224 phases and carrying out 1 **** of n, a return is carried out to 212 phases. On the other hand, with [n] 19 [or more], it is this (2 seconds), i.e., predetermined time. The received power which the line of the control section 22 is carried out to 222 phases since it is judged that it passed, and it accumulates in 218 phases, and is stored in the buffer as PRSSI_READ is broken by the predetermined number of times 20, and it is predetermined time (2 seconds). The average of the received power of a between is calculated. When a calculation of this average is expressed with a formula, it is PRSSI=PRSSI_READ/20.

[0014] The average calculated by this is stored in an extraordinary buffer as PRSSI. Thus, all the processes of this example that calculate the average are 2 seconds (100msx20). It is carried out as 1 cycle.

[0015] The control flow chart for the transmitted power decision which follows this is shown in drawing 3 . Namely, the process in which the transmitted power initial value of a mobile station is set up from the received-power average during predetermined time (2 seconds) into a subscription procedure, The present transmitted power and predetermined time (2 seconds) by received-power average after this subscription procedure and between predetermined time (2 seconds) Front pre-transmitted power is measured, change width of face is investigated, and the process in which the aforementioned present transmitted power is adjusted according to the change width of face is carried out. This drawing 3 is referred to and it is predetermined time (2 seconds). The transmitted power decision process performed as 1 cycle is explained.

[0016] It judges whether a mobile station is subscription taking the necessary procedure for a control section 22 in 310 phases within predetermined time (2 seconds). This subscription procedure means the procedure performed for the communication with a base station at the very first. If judged as under a subscription procedure in 310 phases, a control section 22 will advance in 318 phases, and will determine the first transmitted power. Decision of transmitted power is performed by the following formula in these 318 phases (in the case [Generally BER= 10] of -4 -105dBm). PMTX =PRTX-PRSSI+PREF -- PMTX : The transmitted power of a mobile station, PRTX : The transmitted power of a base station, the received-power average of PRSSI:mobile station, PREF : Received power desired in a base station.

[0017] If it is judged that the subscription procedure was completed in 310 phases, it will go on to 312 phases, and a control section 22 is transmitted power PMTX after a subscription procedure. It calculates. Although the formula of this calculation is also the same as that of the formula of the aforementioned initial transmitted power, PRSSI is the average of the received power for which it asks as mentioned above, and serves as the value to change.

[0018] It is transmitted power PMTX of a mobile station at 312 phases. When it determines, control sections 22 are 314 phases and 316 phases, and it is the determined transmitted power PMTX. Predetermined time (2 seconds) The change width of face of front transmitted power PMTX_2 is checked. In 314 phases, the change width of face by the side of + is checked, and if it is judged that predetermined change width of face (1.5dBm) is exceeded, it will go on to 320 phases. If these 314 phases are expressed with a formula, it will become PMTX >PMTX_2+1.5[dBm]. The control section 22 which progressed to 320 phases is transmitted power PMTX of a mobile station. Only a predetermined size (3dBm) is made to increase and it determines. If these 320 phases are expressed with a formula, it will become PMTX=PMTX_2+3[dBm].

[0019] On the other hand, if it is NO in 314 phases, the change width of face by the side of - will be checked in 316 phases, and it is predetermined change width of face (1.5dBm). If it is judged that it has exceeded, a control section 22 will advance to 324 phases. If these 316 phases are expressed with a formula, it will become PMTX <PMTX_2-1.5[dBm]. the control section 22 which progressed to 324 phases -- transmitted power PMTX of a mobile station Predetermined size (3dBm) only -- it is made to decrease and determines If these 320 phases are expressed with a formula, it will become PMTX =PMTX_2-3[dBm].

[0020] When it is NO in no less than 316 phases, it progresses to 322 phases and a control section 22 is predetermined time (2 seconds). Front transmitted power PMTX_2 are held as

they are. That is, predetermined time (2 seconds) When the change width of face of the transmitted power opened and measured is less than predetermined change width of face (-1.5dBm-+1.5dBm), the same transmitted power is maintained.

[0021]

[Effect of the Invention] After determining suitable transmitted power from the received-power average during predetermined time in a subscription procedure according to this invention, Since the change width of face with the pre-transmitted power of the predetermined time quota which asked for the present transmitted power determined by the received-power average during predetermined time and this present transmitted power is judged and the aforementioned present transmitted power was adjusted The automatic-regulation control of the proper transmitted power required for a communication can be carried out, and the better communication status can be acquired now.

[Brief Description of the Drawings]

[Drawing 1] The important section block diagram of the mobile station concerning this invention.

[Drawing 2] The flow chart of the received-power average extraction control concerning this invention.

[Drawing 3] The flow chart of the transmitted power adjustment control concerning this invention.

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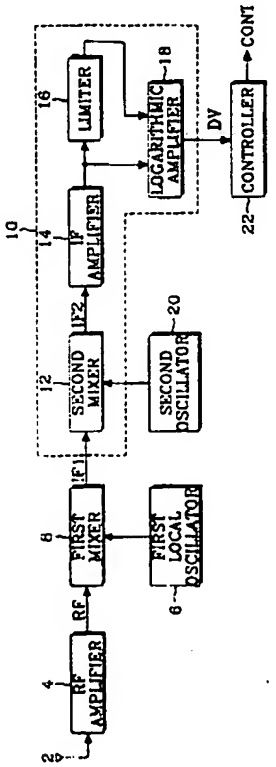
(54)【発明の名称】　移動局送信電力制御方法

(57)【要約】

【課題】　受信電力と送信電力を常に最適の状態に自動制御可能な送信電力制御方法を提供する。

【解決手段】　ＩＦ増幅器１４とリミッタ１６の出力が対数増幅器１８で直流電圧ＤＶに変換され、これを用いて制御部２２が当該移動局の受信電力（ＲＳＳＩ）の測定を行い、該測定結果から送信電力を決定して制御する。その方法は、所定時間の間の受信電力平均値と、基地局から伝送されたパケットより分析される基地局の送信電力及び基地局で望む受信電力と、から送信電力を計算して調整することを特徴とする。加入手続中には基地局の送信電力から受信電力平均値を引いた値を基地局で望む受信電力に加えて送信電力を決定し、加入手続後には基地局の送信電力から受信電力平均値を引いた値を基地局で望む受信電力に加えて現送信電力を決定する第１段階と、前の送信電力と現送信電力との間の変化幅に応じて現送信電力を調整する第２段階と、を行うようにする。



【特許請求の範囲】
【請求項１】　基地局との無線通信を行う移動局における送信電力制御方法であって、所定時間の間の受信電力平均値と、基地局から伝送されたパケットより分析される基地局の送信電力及び基地局で望む受信電力と、から送信電力を計算して調整することを特徴とする移動局送信電力制御方法。
【請求項２】　受信電力平均値は、所定時間の間に所定回数得た受信電力値を足して前記所定回数で割ることで求める請求項１記載の移動局送信電力制御方法。
【請求項３】　加入手続中には、基地局の送信電力から受信電力平均値を引いた値を基地局で望む受信電力に加えて送信電力を決定する請求項１又は請求項２記載の移動局送信電力制御方法。
【請求項４】　加入手続後には、基地局の送信電力から受信電力平均値を引いた値を基地局で望む受信電力に加えて現送信電力を決定する第１段階と、前記受信電力平均値を求めた所定時間の前の前送信電力と前記現送信電力との間の変化幅に応じて前記現送信電力を調整する第２段階と、を行う請求項３記載の移動局送信電力制御方法。
【請求項５】　第２段階は、前送信電力と現送信電力との間の変化が所定の変化幅を越える場合には所定量を前記前送信電力に対し増減して調整し送信電力とし、前記所定の変化幅内に収まっていれば第１段階の現送信電力をそのまま送信電力とする請求項４記載の移動局送信電力制御方法。
【請求項６】　基地局との無線通信を行う移動局における送信電力制御方法であって、
所定時間の間に所定回数得た受信電力値を足して前記所定回数で割ることで受信電力平均値を求める第１過程と、基地局の送信電力から前記受信電力平均値を引いた値を基地局で望む受信電力に加えて現送信電力を決定する第２過程と、前記受信電力平均値を求めた所定時間の前の前送信電力と前記現送信電力との間の変化幅に応じて前記現送信電力を調整する第３過程と、を行うことを特徴とする移動局送信電力制御方法。
【請求項７】　基地局の送信電力及び基地局で望む受信電力は、基地局から伝送されるパケットの分析による請求項６記載の移動局送信電力制御方法。
【請求項８】　第２過程は移動局の加入手続中にも行われ、第３過程は、移動局の加入手続後に通信が行われる間、受信電力平均値を求める所定時間を１サイクルとして繰り返される請求項６又は請求項７記載の移動局送信電力制御方法。
【請求項９】　第３過程は、前送信電力と現送信電力との間の変化が所定の変化幅を越える場合には所定量を前記前送信電力に対し増減して調整し送信電力とし、前記所定の変化幅内に収まっていれば第２過程の現送信電力をそのまま送信電力とする請求項６～８のいずれか１項に記載の移動局送信電力制御方法
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、基地局との無線通信を行う移動局に関し、特に、移動局の送信電力を調節する方法に関する。
【０００２】
【発明が解決しようとする課題】無線通信の移動局においては、受信電力の強度は移動位置によって変化するが、送信電力の方は最初の加入手続きのときに決定された送信電力が常に保持されることになるので、状況に応じた最適の通信を行えるという訳ではない。
【０００３】そこで本発明の目的は、受信電力と送信電力を常に最適の状態に自動制御可能な送信電力制御方法を提供することにある。
【０００４】
【課題を解決するための手段】この目的のために本発明では、基地局との無線通信を行う移動局における送信電力制御方法として、所定時間の間の受信電力平均値と、基地局から伝送されたパケットより分析される基地局の送信電力及び基地局で望む受信電力と、から送信電力を計算して調整することを特徴とする移動局送信電力制御方法を提供する。その受信電力平均値は、所定時間の間に所定回数得た受信電力値を足して前記所定回数で割ることで求めることができる。また、加入手続中には、基地局の送信電力から受信電力平均値を引いた値を基地局で望む受信電力に加えて送信電力を決定するようにし、加入手続後には、基地局の送信電力から受信電力平均値を引いた値を基地局で望む受信電力に加えて現送信電力を決定する第１段階と、前記受信電力平均値を求めた所定時間の前の前送信電力と前記現送信電力との間の変化幅に応じて前記現送信電力を調整する第２段階と、を行うようにする。その第２段階は、前送信電力と現送信電力との間の変化が所定の変化幅を越える場合には所定量を前記前送信電力に対し増減して調整し送信電力とし、前記所定の変化幅内に収まっていれば第１段階の現送信電力をそのまま送信電力とする。
【０００５】また本発明によれば、基地局との無線通信を行う移動局における送信電力制御方法として、所定時間の間に所定回数得た受信電力値を足して前記所定回数で割ることで受信電力平均値を求める第１過程と、基地局の送信電力から前記受信電力平均値を引いた値を基地局で望む受信電力に加えて現送信電力を決定する第２過程と、前記受信電力平均値を求めた所定時間の前の前送信電力と前記現送信電力との間の変化幅に応じて前記現送信電力を調整する第３過程と、を行うことを特徴とする移動局送信電力制御方法を提供する。
【０００６】基地局の送信電力及び基地局で望む受信電力は、基地局から伝送されるパケットの分析によるものとすればよい。また、第２過程は移動局の加入手続中に

も行われ、第3過程は、移動局の加入手続後に通信が行われる間、受信電力平均値を求める所定時間を1サイクルとして繰り返されるものとすることができる。その第3過程は、前送信電力と現送信電力との間の変化が所定の変化幅を越える場合には所定量を前記前送信電力に対し増減して調整し送信電力とし、前記所定の変化幅内に収まっていれば第2過程の現送信電力をそのまま送信電力とするものとする。

【0007】

【発明の実施の形態】以下、本発明の実施形態につき添付図面を参照して詳細に説明する。

【0008】図1に、本例の移動局についてブロック図で示す。アンテナ2を通じて受信される無線信号は、無線周波数（RF：Radio Frequency ）増幅器4によって増幅される。この増幅後の受信信号は、第1混合器8によって第1局部発振器6からの周波数と混合され、第1中間周波数（IF：Intermediate Frequnecy）信号IF1となる。そして更にこのIF1が第2混合器12によって第2局部発振器20からの周波数と混合され、第2中間周波数信号IF2となる。第2中間周波数信号IF2はIF増幅器14によって増幅された後、リミッタ(Limiter) 16によって振幅に制限が加えられる。通常は、このリミッタ16から出力される信号が使用者に提供される信号である。

【0009】本例では、IF増幅器14とリミッタ16から出力される信号の電流量が対数増幅器18で直流電圧DVに変換される。この出力される直流電圧DVを用いて制御部22は、当該移動局の受信電力の強度(Received Signal Strength Indicator ：RSSI) の測定を行うことができる。そして制御部22は、RSSIの測定結果から送信電力を決定した後、送信電力を制御するための制御信号CONTを出力する。

【0010】図2に、そのRSSIを決定する際の制御フローチャートを示してある。即ち、所定の周期（100mS）で受信信号のRSSI値を読み込んで電力単位に変換する過程と、この変換電力を累積合算する過程と、所定時間（2秒）の間に累積合算された値の平均値を計算する過程と、が実施される。まず、図2を参照してこの受信電力の平均値を求める過程を説明する。

【0011】210段階で制御部22は、カウンタ値nを"0"にセットする。このカウンタ値を設定する理由は、所定時間（2秒）内に所定周期（100mS）の回数＝この例では"20"をカウントするためである。そして212段階では、内部タイマをチェックして100mSの経過を判断する。この100mSは、適宜設定可能である。100mSが経過した場合は214段階に進行して制御部22は、RSSI値を読み込む。このRSSI値は、IF増幅器14及びリミッタ16から出力される信号の電流量を対数増幅器18で変換した直流電圧DVによって提供される。制御部22は、読み込んだRSSI値を電力単位に変換する。下記 表1は、対数増幅器18から出力される直流電圧DVに対応する電力単位を示している

【表1】

直流電圧（DV）〔V〕	電力単位〔dBm〕
0．5	−120
1．0	−110
1．5	−100
2．0	−90
2．5	−80
3．0	−70
3．5	−60
4．0	−50
4．5	−40
5．0	−30
5．0	−20
5．0	−10

【0012】表1によって変換された電力単位は、218段階で、前の所定周期で変換された電力単位に累積加算されて臨時バッファにPRSSI READとして貯蔵される。制御部22は続く220段階で、カウンタ値nが19より小さいか否かを確認する。この220段階を行う理由は、所定時間（2秒）が経過したかどうかを判断するためである。

【0013】220段階でカウンタ値nが19より小さければ、これは即ち所定時間（2秒）が経過していないと判断され、224段階へ進行してnを1増加させた後に212段階へリターンする。一方、nが19以上であれば、これは即ち所定時間（2秒）が経過したと判断されるので、制御部22は222段階へ行し、218段階で累積加算されてバッファにPRSSI READとして貯蔵されている受信電力を所定の回数20で割り、所定時間（2秒）の間の受信電力の平均値を計算する。この平均値の計算を数式で表すと、PRSSI＝PRSSI READ／20である。

【0014】これにより計算された平均値は、臨時バッファにPRSSIとして貯蔵される。このように平均値を求める本例の全過程は、2秒（100ms×20）を1サイクルとして行われる

【0015】図3に、これに続く送信電力決定のための制御フローチャートを示してある。即ち、加入手続中に所定時間（2秒）の間の受信電力平均から移動局の送信電力初期値を設定する過程と、この加入手続後、所定時間（2秒）の間の受信電力平均による現送信電力と所定時間（2秒）前の前送信電力とを比較して変化幅を調べ、その変化幅に応じて前記現送信電力を調整する過程と、を実施する。この図3を参照して、所定時間（2

秒）を1サイクルとして行われる送信電力決定過程を説明する。

【0016】310段階で制御部22は、移動局が加入手続中であるか否かを所定時間（2秒）の内に判断する。この加入手続は、一番最初に基地局との通信のために行われる手続を意味している。310段階で加入手続中と判断されれば制御部22は、318段階に進行して最初の送信電力を決定する。この318段階で、送信電力の決定は次の数式によって行われる（一般にBER＝10⁻³の場合、−105dBm）。PMTX ＝PRTX −PRSSI＋PREF …PMTX ：移動局の送信電力，PRTX ：基地局の送信電力，PRSSI：移動局の受信電力平均値，PREF ：基地局で望む受信電力。

【0017】制御部22は、310段階で加入手続が完了したと判断されると312段階へ進行し、加入手続後の送信電力PMTX を計算する。この計算の数式も前記初期送信電力の計算式と同一であるが、但し、PRSSIは上述のようにして求める受信電力の平均値で、変動する値となる。

【0018】312段階で移動局の送信電力PMTX が決定されると制御部22は、314段階と316段階で、その決定した送信電力PMTX と所定時間（2秒）前の送信電力PMTX　2との変化幅を確認する。314段階では＋側への変化幅が確認され、所定の変化幅（1．5dBm）を越えると判断されると320段階へ進行する。この314段階を数式で表すと、PMTX ＞PMTX　2＋1．5｜dBm｜になる。320段階へ進んだ制御部22は、移動局の送信電力PMTX を所定の大きさ（3dBm）だけ増加させて決定する。この320段階を数式で表すと、PMTX＝PMTX　2＋3｜dBm｜になる。

【0019】一方、314段階でNOであれば316段階で−側への変化幅が確認され、所定の変化幅（1．5dBm）を上回っていると判断されると制御部22は、324段階へ進行する。この316段階を数式で表すと、PMTX ＜PMTX　2－1.5｜dBm｜になる。324段階へ進んだ制御部22は、移動局の送信電力PMTX を所定の大きさ（3dBm）だけ減少させて決定する。この320段階を数式で表すと、PMTX ＝PMTX　2－3｜dBm｜になる。

【0020】316段階でもNOであった場合は322段階に進んで制御部22は、所定時間（2秒）前の送信電力PMTX　2をそのまま保持する。つまり、所定時間（2秒）あけて計った送信電力の変化幅が所定の変化幅（−1．5dBm～＋1．5dBm）以内である場合は、同じ送信電力を維持する。

【0021】

【発明の効果】本発明によれば、加入手続中に所定時間の間の受信電力平均から適切な送信電力を決定した後、所定時間の間の受信電力平均により決定される現送信電力とこの現送信電力を求めた所定時間分前の前送信電力との変化幅を判断して前記現送信電力を調整するようにしたので、通信に必要な適正送信電力を自動調節制御することができ、より良好な通信状況を得られるようになる。

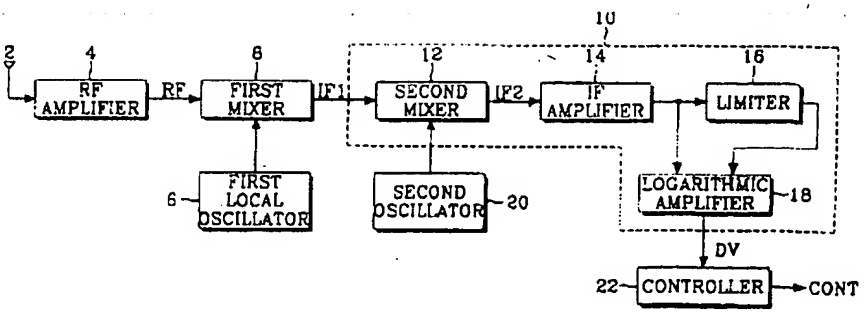
【図面の簡単な説明】

【図1】本発明に係る移動局の要部ブロック図。

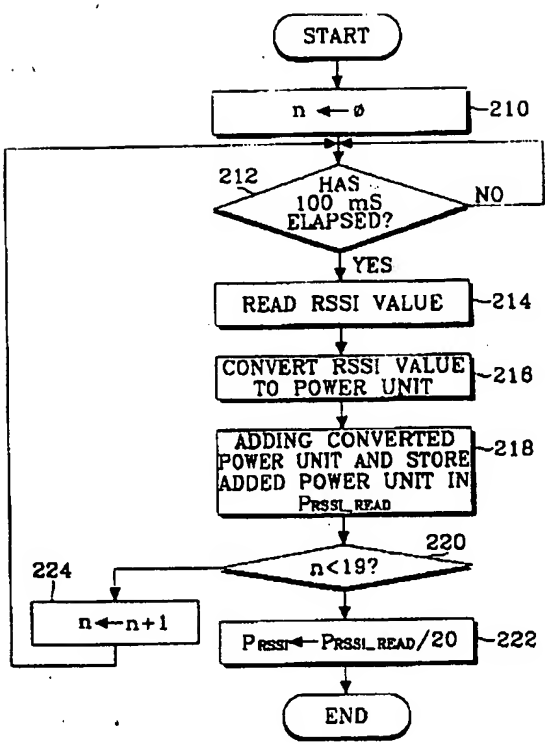
【図2】本発明に係る受信電力平均値抽出制御のフローチャート。

【図3】本発明に係る送信電力調整制御のフローチャート。

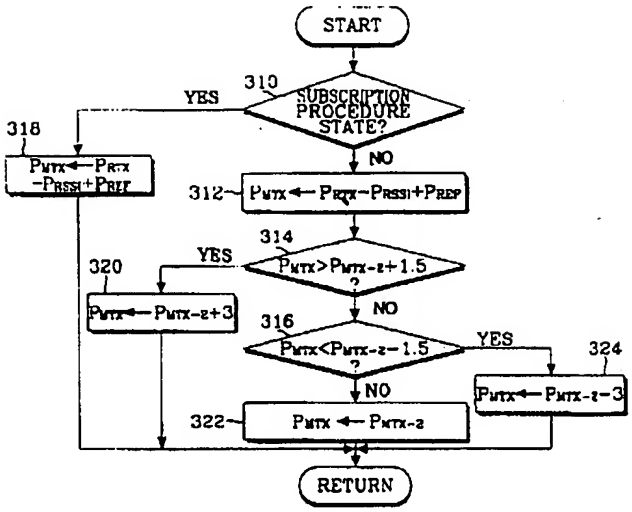
【図1】



【図2】


START
n ← ø
210
212
HAS 100 mS ELAPSED?
NO
YES
READ RSSI VALUE
214
CONVERT RSSI VALUE TO POWER UNIT
216
ADDING CONVERTED POWER UNIT AND STORE ADDED POWER UNIT IN PRSSI_READ
218
220
n<19?
224
n←n+1
PRSSI←PRSSI_READ/20
222
END

【図3】


START
310
SUBSCRIPTION PROCEDURE STATE?
YES
318
PMTX←PRTX -PRSSI+PREF
NO
312
PMTX←PRTX-PRSSI+PREP
314
PMTX>PMTX-2+1.5 ?
YES
320
PMTX←PMTX-2+3
NO
316
PMTX<PMTX-2-1.5 ?
YES
324
PMTX←PMTX-2-3
NO
322
PMTX←PMTX-2
RETURN